

# ABSTRACT OF THE DISCLOSURE

A pseudo-random number sequence output unit responsive to  $s$  ( $1 \leq s$ ) number of prescribed positive integers  $q_1, q_2, \dots, q_s$ , a prescribed real impulse constant  $r$  ( $-1 < r < 1$ ), and a prescribed non-zero real constant  $C$  for outputting a pseudo-random number sequence of length  $N$  ( $1 \leq N$ ), which output unit includes:

an input acceptance section that accepts input of  $s$  ( $1 \leq s$ ) number of real number sequence initial values  $Y_1, Y_2, \dots, Y_s$  ( $-1 < Y_1 < 1, -1 < Y_2 < 1, \dots, -1 < Y_s < 1$ ), and  $s$  number of integer parameters  $p_1, p_2, \dots, p_s$  ( $2 \leq p_1, 2 \leq p_2, \dots, 2 \leq p_s$ ) for which  $q_1 \bmod p_1 \neq 0, q_2 \bmod p_2 \neq 0, \dots, q_s \bmod p_s \neq 0$  respectively hold with respect to the prescribed positive integers  $q_1, q_2, \dots, q_s$ ;

a calculation section that uses the prescribed real impulse constant  $r$ , the prescribed non-zero real constant  $C$ , the sequence initial values  $Y_1, Y_2, \dots, Y_s$ , the integer parameters  $p_1, p_2, \dots, p_s$ , the prescribed positive integers  $q_1, q_2, \dots, q_s$  and integers  $j$  ( $1 \leq j \leq s$ ),  $m$  ( $1 \leq m \leq 2N-2$ ) and  $n$  ( $1 \leq n \leq 2N-1$ ) to calculate from the recurrence formula

$$T_p(\cos \theta) = T(p, \cos \theta) = \cos(p\theta)$$

$$y_j[1] = Y_j$$

$$y_j[m+1] = T(p_j, y_j[m])$$

$$z[n] = \prod_{j=1}^s T(q_j, y_j[n])$$

a pseudo-random number sequence  $z'[1], z'[2], \dots, z'[N]$  of length  $N$  that satisfies

$$z'[1] = C \sum_{j=1}^N (-r)^j z[j],$$

$$z'[2] = C \sum_{j=1}^N (-r)^j z[j+1],$$

...

$$z'[N] = C \sum_{j=1}^N (-r)^j z[j+N-1]; \text{ and}$$

an output section that outputs the pseudo-random number sequence  $z'[1]$ ,  $z'[2]$ , ...,  $z'[N]$ . A transmitter, receiver and communication system that utilize the output unit, a filter unit, a pseudo-random number sequence output method, transmission method, receiving method and filtering method are provided. A computer-readable data  
5 recording medium recorded with a program for operating the transmitter, receiver, communication system and implementing the output, transmission and receiving methods is also provided.